

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A support rack for supporting a circuit board having first and second opposite edges, the support rack comprising:

- a board engagement platform having an edge engagement member adapted for contact with respect to the first edge;
- a board retention element spaced from the engagement platform by a first distance, the board retention element having an edge retention member adapted for contact with respect to the second edge, the edge retention member spaced from the board retention element by a second distance and aligned with the edge engagement member;
- a first adjustment mechanism interconnected with respect to the board engagement platform and the board retention element, the first adjustment mechanism permitting adjustment of the first distance; and
- a second adjustment mechanism connected with respect to the board retention element and the edge retention member, the second adjustment mechanism permitting adjustment of the second distance and maintaining the second distance after adjustment;

whereby the first and second adjustment mechanisms ~~can be~~ are independently ~~adjusted such that the edge engagement member and the~~ adjustable to allow positioning of the edge retention member at a desired distance from the edge engagement member such that the edge engagement member and the edge retention member compress the circuit board by contacting the first and second edges, respectively, when the circuit board is supported by the support rack.

2. (currently amended) The rack of claim 1 wherein ~~the~~ the first adjustment mechanism includes apertures spaced from one another, the first adjustment mechanism interconnecting the board engagement platform and the board retention element by affixing the board retention element to at least one aperture, the apertures permitting the first distance to be adjusted in predetermined increments.

3. (currently amended) The rack of claim 2 wherein:

- the first distance is measured along a first axis; and
- the apertures ~~extend~~ are spaced along a second axis substantially parallel to the first axis.

4. (previously presented) The rack of claim 3 wherein:

- the edge engagement member is a linear engagement groove extending along a third axis; and
- the third axis is substantially perpendicular to the first axis.

5. (currently amended) In combination, a circuit board having first and second opposite edges spaced apart by a circuit board length and a rack supporting the board, the rack comprising:

- a frame;
- a board engagement platform mounted with respect to the frame and engaging the first edge;
- a board retention element spaced from the board engagement platform by a first distance;
- a first adjustment mechanism ~~capable of adjusting the first distance~~ coacting with the frame and the board retention element to provide adjustment of the first distance and ~~maintaining~~ to maintain the first distance; and
- a second adjustment mechanism ~~on~~ connected with respect to the board retention element and including an edge retention member for engaging the second edge;

and wherein:

- the board engagement platform and the edge retention member are spaced apart by an operative distance equal to the circuit board length such that the platform and the ~~second adjustment mechanism~~ edge retention member exert compressive force on the board by contacting the first and second opposite edges, respectively.

6. (currently amended) The combination of claim 5 wherein the second adjustment mechanism includes:

- a clamping screw threaded to the board retention element; and
- a locating pin mounted to the clamping screw for relative movement with respect to such screw, the pin including a notch ~~engaging~~ which operates as the edge retention member which engages the second edge of the ~~printed~~ circuit board.

7. (previously presented) The combination of claim 5 wherein:

- the board retention element includes a plurality of second adjustment mechanisms,
- each second adjustment mechanism has a respective clamping screw;
- each clamping screw is threaded to the board retention element; and
- each clamping screw has a respective locating pin mounted thereto.

8. (currently amended) The combination of claim 7 wherein:

- ~~the clamping screws are~~ each second adjustment mechanism has first, second and third clamping screws;
- ~~the locating pins are~~ first, second and third locating pins are mounted on the first, second and third clamping screws, respectively; and
- each locating pin is rotationally movable with respect to the respective clamping screw ~~on which it is mounted~~.

9. (previously presented) The combination of claim 5 wherein:

- the board has a substantially planar surface; and
- the compressive force is exerted substantially parallel to the planar surface.

10. (previously presented) The combination of claim 5 wherein:

- the board has a substantially planar surface; and
- the compressive force is exerted substantially coincident with the planar surface.

11-12. (previously canceled).

13. (currently amended) The support rack of claim 1 wherein:

- the board retention element has first and second ~~pluralities of~~ clamping screws threaded thereto; and
- ~~each clamping screw of the first plurality of clamping screws~~ the first clamping screw has a relatively-movable locating pin coupled thereto.

14. (currently amended) The support rack of claim 21 wherein:

- the board retention element has first and second pluralities of clamping screws threaded thereto;
- each clamping screw of the first and second pluralities ~~plurality and of the second plurality of clamping screws~~ has a locating pin coupled thereto;
- the circuit boards comprise first and second circuit boards;
- the first circuit board is clamped between the platform and the first plurality of clamping screws when supported by the support rack; and
- the second circuit board is clamped between the platform and the second plurality of clamping screws when supported by the support rack.

15. (previously presented) The combination of claim 22 wherein:

- the end panels are first and second end panels having, respectively, first and second rows of vertically-spaced-apart apertures;
- first and second screws extend, respectively, through an aperture of the first and second rows and engage the board retention element.

16. (previously presented) The combination of claim 15 wherein:

- the first and second rows of apertures and the first and second screws comprise the first adjustment mechanism whereby the first distance may be selected in predetermined increments; and
- the first plurality of clamping screws comprises the second adjustment mechanism whereby the second distance may be selected in a continuum.

17-20. (previously canceled).

21. (currently amended) A support rack for supporting circuit boards, each circuit board having first and second opposite edges defining a length, the support rack comprising:

- a board engagement platform having edge engagement members, each edge engagement member being adapted for contact with respect to the first edge of a respective circuit board;
- a board retention element being connected with respect to the engagement platform and spaced from the engagement platform by a first distance; the board retention element having edge retention members, each edge retention member being adapted for contact with respect to the second edge of the respective circuit board, each edge retention member spaced from the board retention element by a second distance and aligned with a respective edge engagement member;
- a first adjustment mechanism interconnected with respect to the board engagement platform and the board retention element, the first adjustment mechanism permitting adjustment of the first distance; and
- a plurality of second adjustment mechanisms, each second adjustment mechanism being connected with respect to the board retention element and the respective edge retention member, each second adjustment mechanism permitting adjustment of the respective second distance;

whereby the first adjustment mechanism and each second adjustment mechanism ~~distances can~~ ~~be~~ are independently ~~adjusted so that the respective edge engagement members and~~ adjustable to allow positioning of each edge retention ~~members can~~ member at a respective desired distance from a respective edge engagement member such that each edge engagement member and respective edge retention member compress a respective circuit ~~boards~~ board of ~~different lengths~~ by contacting the ~~respective~~ first and second edges of the respective circuit board, when the circuit boards are supported by the support rack.

22. (currently amended) The support rack of claim 1 further comprising a frame including a pair of vertical, longitudinally-spaced end panels between which the board engagement platform and the board retention element are supported in spaced relationship to one another, and wherein the circuit ~~boards are~~ board is clamped therebetween when the circuit board is supported by the support rack.

23. (previously presented) The combination of claim 5 further including a vibratory table supporting the rack and the board, and wherein:

- the table includes a mounting surface having a plurality of holes formed therein;
- the rack includes a frame having plural openings formed therein; and
- fasteners extend through the openings into the holes, thereby securing the rack and the boards to the table.

24. (previously presented) The support rack of claim 21 wherein each edge engagement member is a linear engagement groove.

25. (currently amended) The support rack of claim 24 wherein each second adjustment mechanism includes a clamping screw and a locating pin, the clamping screw being threaded to the board retention element and ~~a~~ the locating pin being mounted to the clamping screw for relative movement with respect to such screw, the pin including a notch acting as the edge engagement member to engage the second edge of each respective circuit board.

26. (previously presented) The support rack of claim 21 wherein each second adjustment mechanism maintains the respective second distance after adjustment.

27. (new) In combination, a circuit board having first and second opposite edges and a rack supporting the board, the rack comprising:

- a frame;
- a board engagement platform mounted with respect to the frame and engaging the first edge;
- a board retention element spaced from the board engagement platform by a first distance;
- a first adjustment mechanism coacting with the frame and the board retention element to adjust and maintain the first distance; and
- a second adjustment mechanism connected with respect to the board retention element and engaging the second edge, the second adjustment mechanism including a clamping screw and a locating pin, the clamping screw threaded to the board retention element and the locating pin mounted to the clamping screw for relative movement with respect to such screw, the pin including a notch engaging the second edge of the circuit board;

and wherein the platform and the second adjustment mechanism exert compressive force on the board by contacting the first and second opposite edges, respectively.

Remarks/Arguments

The Office Action has been reviewed with care and certain amendments made which are believed to place this application in condition for allowance. Applicants appreciate the attention of the Examiner to this patent application and the indication of allowability of claims 1-4, 6-8, 13-16, 21-22 and 24-26.

Claims 1-10, 13-16 and 21-26 were pending in this application. Claims 1-4, 13-16, 21-22 and 24-26 were indicated as being allowable if rewritten or amended to overcome a rejection under 35 USC 112, second paragraph. Claims 6-8 were indicated as being allowable if rewritten in independent form. Claims 5, 9-10 and 23 were rejected under 35 USC 103(a) as being unpatentable over Chatel (U.S. Patent No. 5,506,751) in view of Sittig (U.S. Patent No. 5,954,122).

Claims 1 and 21 are herein amended to overcome the objection and 112 rejection of the Office Action. Specifically, each claim was amended to no longer use the phrase "can be" and to more particularly point out and distinctly claim the subject matter which the Applicants regard as the invention.

For instance, the whereby clause of claim 1, as amended, reads:

whereby the first and second adjustment mechanisms are independently adjustable to allow positioning of the edge retention member at a desired distance from the edge engagement member such that the edge engagement member and the edge retention member compress the circuit board by contacting the first and second edges, respectively, when the circuit board is supported by the support rack,

and the whereby clause of claim 21, as amended, reads:

whereby the first adjustment mechanism and each second adjustment mechanism are independently adjustable to allow positioning of each edge retention member at a respective desired distance from a respective edge engagement member such that each edge engagement member and respective edge retention member compress a respective circuit board by contacting the first and second edges of the respective circuit board, when the circuit boards are supported by the support rack.

It is believed that these amended claims more clearly claim the invention. In response to the comments in the Office Action, it is noted that these clauses (both before and after the current amendment) do not require that the first adjustment mechanism support or affect the position of the edge engagement member. Rather, the adjustment mechanisms affect the position of the edge retention member *relative* to the edge engagement member such that the circuit board may be compressed between the edge retention member and edge engagement member.

Therefore, it is believed that independent claim 1 and its dependent claims (claims 2, 3, 4, 13, 15, 16 and 22) and independent claim 21 and its dependent claims (claims 14, 24, 25 and 26) are in proper form for allowance and early favorable action is earnestly solicited.

New claim 27 is added as a rewritten version of claim 6 which was previously indicated as being allowable if rewritten in independent form.

Claim 5 has been amended to require that (1) the first and second opposite edges of the circuit board are spaced apart by a circuit board length, (2) the a first adjustment mechanism coacts with the frame and the board retention element to provide adjustment of the first distance and to maintain the first distance, (3) the second adjustment mechanism include an edge retention member for engaging the second edge, and (4) the board engagement platform and the edge retention member are spaced apart by an operative distance equal to the circuit board length such that the platform and the edge retention member exert compressive force on the board by contacting the first and second opposite edges, respectively.

The Office Action of May 6, 2003 notes suggests that Chatel discloses "a first adjustment mechanism (12;13, column 5, line 6) capable of adjusting the first distance coacting with the frame and the retention member, and maintaining the first distance." As stated above, claim 5 now requires that the "first adjustment mechanism [coact] with the frame and the board retention element to provide adjustment of the first distance and to maintain the first distance." As pointed out in Applicants' earlier communications, Chatel does not provide for any adjustment of the first distance, i.e., the distance between the board retention element spaced and the board engagement platform. The May 6, 2003 Office Action provides no substantive response on this matter. The first paragraph of column 5 of Chatel (which includes the Examiner-indicated passage at column 5, line 6) reads:

FIG. 1 depicts an illustrative rack or card cage 10 for removably positioning printed circuit boards 11 according to this invention. The card cage 10 includes spaced, opposed lateral or side panels 12,13 that are substantially parallel with planar surfaces of the printed circuit boards (e.g., 14) positioned in the cage. It will be understood that these panels may be solid or open-frame structures. A connector panel 15 extends transversely to the side panels 12, 13 and defines a back plane of the card cage. The connector panel 15 provides electrical connections between electronic components (e.g. 14') on the printed circuit boards 14 positioned in the card cage with other electronic components that may be on such circuit boards or at remote locations.

This passage does not mention a first adjustment mechanism or even the idea of adjustment. Applicants cannot properly respond to any rejection utilizing Chatel as teaching a first adjustment mechanism unless the Examiner can identify such an adjustment mechanism, or any means of adjustment at all, in Chatel. Therefore, Applicants again request that the Examiner specifically identify the feature, passage or teaching of Chatel which discloses a first adjustment mechanism.

The October 21, 2002 Office Action states "Chatel discloses two panels (12,13) adjustable secured in a frame by screws (24) into holes of the panels (12,13). The panel (12) shows holes and the screws (24) can be secured [into] either one of the holes on each of the [panels] for adjusting the panels fastened to the frame."

Applicants again request that the Examiner identify such optionally-used holes or disclose where such optionally-used holes exist. In the absence of such a showing, the Applicants again point out that Figure 1 clearly shows multiple screws (24) being used to fix panel 12 to side rails (20,21 and 22,23). No holes remain unused or optionally-usable. Therefore, because every disclosed hole is filled with a screw and Chatel fails to disclose any other "hole" into which a screw may be optionally secured to adjust the distance between rails, there cannot be any choice of holes or adjustment based on such a choice of holes. Furthermore, nowhere in the disclosure of Chatel is it mentioned that the distance between rails (20,21) and rails (22,23) may be adjusted by any means, let alone by choosing optionally-usable holes on panels (12,13).

It is noted that, as discussed extensively in the Applicants' communication of January 9, 2002, the device of Sittig does not exert compressive force on the board by contacting the first and second opposite edges. Instead, Sittig compresses the opposite surfaces of the circuit board. Sittig's Figure 3 plainly shows that the clamps (22) do not compress the second edge, shown as the upper edge, of plate (16). Instead, clamps are used along with cam surface (22) to provide a tightening force from flat surface (18) against the broad side-surface of the plate (against the right side as depicted). If the Examiner was interpreting such surfaces as being opposite edges, he can no longer do so since claim 5 requires that the first and second opposite edges of the circuit board be spaced apart by a circuit board length and the board engagement platform and the edge retention member are spaced apart by an operative distance equal to the circuit board length.

Furthermore, as stated in the Applicants' January 9, 2003 communication, Sittig explains clearly that the "adjustability" of clamps is intended to allow each clamp to be pushed downward, out of contact with cam surface (20) so that plate may be positioned into slot, i.e., clamps are removed from the slots so that plates can be inserted into the slots. Then each clamp is released and is pulled back into its normal position in the slot by tensioning spring (26). At column 2, lines 29-31, Sittig states "shock or vibration to device 10 resulting in a movement of plates translates into a tightening action of clamps 22 on plates 16," i.e., clamps are pulled upward against the cam surface and exert an increasing force against the broad side-surface of the plates.

Sittig does not disclose: 1) an adjustment mechanism including an edge retention member for engaging the second (upper) edge of a circuit board, 2) an edge retention member which compresses a circuit board by contacting the second edge, 3) a compressive force which is exerted substantially parallel to the broad side-surface of a circuit board, or 4) a compressive force which is exerted substantially coincident to the broad side-surface of a circuit board.

Instead Sittig discloses: 1) a clamp which contacts only the broad side-surface of a plate, 2) a clamp which compresses a plate by contacting only the broad side-surface; and 3-4) a compressive force which is exerted substantially normal or perpendicular to the broad side-surface of a plate.

Therefore, the Applicants reiterate their prior arguments that, as required by independent claim 5:

- the first adjustment mechanism must permit adjustment of the distance between the board retention member and the engagement platform.
- the platform and board retention member must be spaced apart by the circuit board length such that the platform and edge retention member compress the circuit board by contacting the first and second edges.

These requirements are not disclosed or made obvious by any combination of the cited prior art.

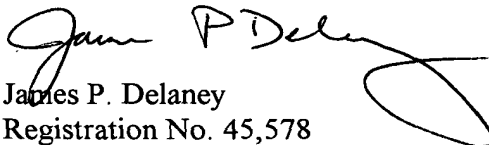
As stated above, Chatel discloses a rigid, non-adjustable connection between its side rails and connecting panel by providing holes into which an equal number of screws are inserted and by not providing any additional holes for adjustability. The Chatel rack is intended simply to house circuit boards. It is not intended for use during vibrational-type tests and is not intended to address the problems associated with such testing. Furthermore, as explained above, Sittig provides only for contact with a plate along its broad-side surface – not along its edges.

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Because independent claim 5 includes elements not disclosed or made obvious by the cited prior art, Applicants believe that claims 5, 6, 7, 8, 9, 10 and 23, as amended, in addition to the claims earlier discussed, are in proper form for allowance and early favorable action is earnestly solicited. The Examiner is invited to call the undersigned attorney if that would be helpful in facilitating resolution of any issues which might remain.

Respectfully submitted,


James P. Delaney
Registration No. 45,578

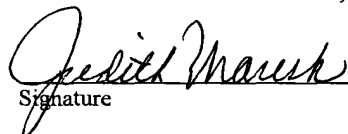
Dated: August 6, 2003

Jansson, Shupe & Munger, Ltd.
245 Main Street, Suite M
Racine, WI 53403-1034
Telephone: (262) 632-6900
Atty. Docket No.: TI-121US/RCE

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